Engagement Theory: A Framework for Technology-Based Teaching and Learning

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Engagement Theory: A Framework for Technology-Based Teaching and Learning

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Engagement theory has emerged from the authors' experiences teaching in electronic and distance education environments (see Kearsley, 1997; Shneiderman, 1994, 1998; Shneiderman et al., 1995). The fundamental idea underlying engagement theory is that students must be meaningfully engaged in learning activities through interaction with others and worthwhile tasks. While, in principle, such engagement could occur without the use of technology, we believe that technology can facilitate engagement in ways which are difficult to achieve otherwise. So engagement theory is intended to be a conceptual framework for technology-based learning and teaching.

Although not directly derived from other theoretical frameworks for learning, it has much in common with many such frameworks. For example, with its emphasis on meaningful learning, it is very consistent with constructivist approaches. Because it emphasizes collaboration among peers and a community of learners, it can be aligned with situated learning theories. Because its focuses on experiential and self-directed learning, it is similar in nature to theories of adult learning.

Basic Principles

By engaged learning, we mean that all student activities involve active cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation. In addition, students are intrinsically motivated to learn due to the meaningful nature of the learning environment and activities.

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Engagement theory is based upon the idea of creating successful collaborative teams that work on ambitious projects that are meaningful to someone outside the classroom. These three components, summarized by Relate-Create-Donate, imply that learning activities:

(1) occur in a group context (i.e., collaborative teams);
(2) are project-based; and
(3) have an outside (authentic) focus.

The first principle (the "Relate" component) emphasizes team efforts that involve communication, planning, management, and social skills. The modern workplace demands proficiency in these skills, yet historically students have been taught to work and learn on their own. Research on collaborative learning suggests that in the process of collaboration, students are forced to clarify and verbalize their problems, thereby facilitating solutions. Collaboration also increases the motivation of students to learn, a significant consideration in settings with high drop-out rates (e.g., teenagers, distance learners). Furthermore, when students work in teams, they often have the opportunity to work with others from quite different backgrounds, and this facilitates an understanding of diversity and multiple perspectives.

The second principle (the "Create" component) makes learning a creative, purposeful activity. Students have to define the project (problem domain) and focus their efforts on application of ideas to a specific context. Conducting their own projects is much more interesting to students than answering sterile textbook problems. And because they get to define the nature of the project (even if they don't choose the topic), they have a sense of control over their learning which is absent in traditional classroom instruction. Project orientation is the essence of Problem-Based Learning (PBL) approaches, which are often used in medical and other types of professional education (e.g., Barrows & Tamblyn, 1980).

The third principle (the "Donate" component) stresses the value of making a useful contribution while learning. Ideally each project has an outside "customer" that the project is being conducted for. The customer could be a campus group, community organization, school, church, library, museum, government agency, local business, or needy individual. In many cases, the projects can be work-related, i.e., an activity that fits into a team's occupational or career interests. The authentic learning context of the project increases student motivation and satisfaction. This principle is consistent with the emphasis on school-to-work programs in many school systems and colleges, as well as the "service" philosophy of contemporary corporate training efforts (e.g., Jacoby & Associates, 1996).

Engagement theory is different from many older

models of computer-based learning in which the emphasis was on individualized instruction and interactivity. Engagement theory does promote interaction, but human interaction in the context of group activities, not individual interaction with an instructional program. The latter form of interaction tended to be measured by single responses (e.g., key presses or mouse clicks), whereas engagement requires assessment of larger units of work (e.g., reports, programs, user satisfaction). The difference between engagement and interactivity reflects the shift in thinking about computers in education as *communication tools* rather than some form of *media delivery devices*. Furthermore, engagement theory places a great deal of emphasis on providing an authentic (i.e., meaningful) setting for learning, something not present in previous models.

About Collaboration

Collaboration can be as simple as a two-minute in-class exercise involving pairs of students or as elaborate as a multi-year curriculum-development project involving many teams. Term-length projects done primarily outside the classroom are the most popular form of collaboration, since they require minimal changes to the usual classroom routine. While a few disciplines, such as laboratory science or fine arts, make regular use of in-class collaboration, most courses do not. Yet collaborative learning is a technique that applies to any domain. Math students can work on problems, English students can review each other's work, computer science students can develop or debug programs together, and so on.

E-mail is one of the most important collaborative tools, and it usually serves as the communication backbone for all activities. Web conference boards or chat programs may also be important means for collaboration and sharing of results. The Web will probably play an important role in terms of acquiring information. Students are also likely to make use of telephone conferences and fax communications, although these are not as convenient or cost-effective as online interaction. In the future, we may see desktop video become popular as a means for inexpensive face-to-face interaction in a distributed learning environment.

Since collaborative methods may be novel for many students and teachers, there is likely to be a high level of uncertainty at the beginning of such activities. Students will need guidance in working together, including skills such as project management, scheduling, time management, leadership, consensus-building, etc. Teachers will need practice in organizing and conducting collaborative activities, particularly the facilitative role that is needed. A lot of attention has to be devoted to ways in which student teams can most effectively present and share their results with each other. And both students and teachers will need training and support in the use of all online communication tools.

Project-Oriented Learning

Probably the most difficult aspect of project-oriented learning is the initial definition of the project (and corresponding formulation of teams). The instructor can provide a list of suggested topics, which helps give students an idea of possible projects. Alternatively, the instructor can provide lists/descriptions of past projects (including links to the actual project materials if available on the Web). In addition, students should be provided with a description of the criteria that will be used to evaluate the projects to help them determine the appropriateness of their project ideas.

Unless the assignment of team partners is done arbitrarily (usually acceptable for short in-class activities but not longer projects), students need a way to get to know each other quickly. For this reason, it is important to have students create some sort of bios or background statements, especially in the form of an online directory, as the initial class activity. Ideally, students can complete a number of brief group activities with different partners in the first few classes so they can make a good choice of team members for full-scale projects. In this context, students need to be sensitized to issues such as gender/racial bias, personality conflicts, and different work habits.

A good starter activity is to assign pairs of students to research a question or problem and report their results to the entire group. A further step is to ask teams to evaluate each other's work. Alternatively, a team can be composed of three individuals, one of whom is charged with proposing an initial answer, the second providing an alternative answer, and the third offering a critique or synthesis of the first two responses.

The Web provides a tremendous resource for collaborative efforts, since it is easy to quickly uncover a lot of information about any topic. A natural project for students is to produce an online textbook or encyclopedia for their course. With a class of 10–100 students, this becomes a major effort with an editorial board to develop an outline, specify the audience, produce a style guide, manage assignments, and arrange reviews. For example, students in the second author's graduate seminar on Virtual Reality produced EVE (Encyclopedia of Virtual Environments) which continues to be available online *[http://www.hitl. washington.edu/scivw/EVE]*. As another example, students in the first author's courses on distance education are asked to produce case studies of distance education programs to be assembled into a directory of distance education. When student projects are put up on the Web, this provides an incentive for them to do the best possible work, since they know that their work will be viewed by their classmates and possibly the

whole world. It also provides an easily accessible source to show their work to friends, co-workers, or potential employers.

Authentic Focus

The third component of engagement, doing projects with a realistic focus, also requires some new techniques for teaching/learning. For students without much work experience, the idea of doing a project for an "outside" customer (even if it's an on-campus group) is a bit daunting. For students who have jobs and work experience, it is a little easier, since they can identify a project within their own organization which is familiar to them. The instructor must screen all potential projects to ensure that they are appropriate for the subject matter involved and that the scope of work is feasible within the timeframe available. The instructor also serves as the student-client interface and must ensure that expectations (on both sides) are realistic for student projects completed in an academic context.

In the second author's courses, students have worked on campus-related projects such as developing online systems for scheduling bus service and a television station, keeping records for a scuba club, designing a student ride board, organizing car pools, and creating an accounting system for the physics department. Off-campus projects have included donor and volunteer list management for a major charity, scheduling for a county recreation office, information management for a day-care center, and many others. Other projects have included a guide to science education software for parents, a hypermedia guide to computer viruses, and a plan for computer usage in a local high school.

In the first author's courses, students often do projects related to their work environments (they are part-time graduate students with full-time jobs). However, these are usually projects that they would not tackle as part of their regular job duties. Instead, they tend to pick ideas that are outside their usual area of expertise or responsibility. This includes projects for self-help groups (e.g., smoking cessation or stress reduction), pilot tests of innovative technologies, development of strategic plans, comparative studies of other organizations, employee orientation programs, community outreach efforts, or alternative modes of training.

There are many payoffs to students from having this kind of realistic focus to course activities. Since learning takes place in an authentic context, students learn skills and knowledge with higher transfer to work settings. They also learn many skills associated with teamwork and client interaction that are often not taught in courses (but probably should be). Doing authentic projects provides a higher level of satisfaction to students than working on artificial problems, since they can see the outcomes/impact of their work on people and organizations. Finally, the results of their efforts may bring them professional recognition or awards which are ultimately much more motivating then grades.

Research Issues

The basic principles of engagement theory just discussed are based upon the teaching experiences of the authors and grounded in well-established learning theories. However, engagement theory has not been subjected to empirical test. Each tenet of the theory needs to be investigated and examined via research or evaluation studies.

Some examples of research questions to be addressed include:

- With what curricula, disciplines, or age groups is engagement theory most/least effective?
- What skills do students need in order to effectively participate in collaborative activities? How should they acquire these skills?
- How should individual differences be addressed in collaborative work?
- What kind of student evaluation methods are most appropriate to the application of engagement theory?
- Which component of engagement theory (i.e., relate, create, donate) is the most important in terms of different aspects of learning?
- How do we best prepare (retrain) instructors to apply engagement theory?
- What kind of groupware (collaborative software tools) would best support engagement theory?
- How does engagement theory "scale up" for large classes and many simultaneous courses at the same or different institutions?

While not conducted in the specific context of engagement theory, a study conducted by Alavi (1994) on collaborative learning is suggestive of the kind of research that needs to be done. In this study, graduate business students taking classes in an electronic classroom were compared to those taking classes in a traditional classroom (all taught by the same instructor). The teaching/learning activities of the classes were the same except that the electronic classroom students used a groupware program (VisionQuest) for their collaborative learning exercises. A post-course questionnaire was used to measure students' perceptions of their learning experience. The findings indicated that the technology-mediated collaborative learning resulted in higher levels of perceived skill development, self-reported learning, and utility than the traditional classroom. Furthermore, the test grades of the group of students who were in the electronic classroom were statistically higher (t[125] = 3.92, p < .001) than those of the groups of students in the traditional classroom.

Another body of research also highly relevant to

engagement theory, although also not specifically conducted in this context, is the work of Hiltz and others (e.g., Hiltz, 1994; Harasim *et al.*, 1995) related to online/virtual learning environments. Hiltz reports on an extensive evaluation of the New Jersey Institute of Technology virtual classroom project that spanned many years, courses, and instructors. Their network capabilities included messaging, conferencing, online notebooks, online databases, online exams, and online gradebooks. They concluded that the virtual classroom environment resulted in better mastery of course materials, greater student satisfaction, and a higher level of student-reported learning than traditional classroom experiences.

It may be worth noting that the focus of engagement theory on meaningful and real-world learning activities is consistent with a more general trend in education. For example, the U.S. Department of Education and U.S. Department of Labor jointly fund the National School to Work program (see *http://www.stw.ed.gov*) aimed at helping young people make the transition from school to careers and lifelong learning. Research and evaluation studies emerging from this domain may be relevant to engagement theory.

Conclusions

Engagement theory is presented as a model for learning in technology-based environments which synthesizes many elements from past theories of learning. The major premise is that students must be engaged in their course work in order for effective learning to occur. The theory posits three primary means to accomplish engagement: (1) an emphasis on collaborative efforts, (2) project-based assignments, and (3) non-academic focus. It is suggested that these three methods result in learning that is creative, meaningful, and authentic.

The role of technology in the theory is to facilitate all aspects of engagement. The use of e-mail, online conferencing, Web databases, groupware, and audio/videoconferencing significantly increases the extent and ease of interaction among all participants, as well as access to information. The vast array of software tools available for analysis, design, planning, problem-solving, and making presentations enable students to do sophisticated and complex tasks. Technology provides an electronic learning environment that fosters the kind of creativity and communication needed to nourish engagement.

We believe that engagement theory represents a new paradigm for learning and teaching in the information age, emphasizing the positive role that technology can play in human interaction and evolution. We challenge others to examine this theory and test it in their own teaching efforts. ☐

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